ON THE STRUCTURE AND SYSTEMATIC POSITION OF *CYSTOPELTA*.

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(Communicated by John Brazier, F.L.S.)

(Plate 1.)

The privilege of investigating this interesting animal, I owe to the courtesy of Mr. Brazier, who allowed me to examine a couple of specimens collected by Mr. R. Helms in Wilson's Valley, on the flanks of Mt. Kosciusko, at an elevation of 5000 ft.

Nothing resembling it has, so far as I am aware, been recorded from Australia, but the mollusk at once recalled the description of *Cystopelta petterdi*, Tate, (Trans. Roy. Soc. Tas. 1880, p. 17) to which externally it closely corresponds. Never having had an opportunity of examining the Tasmanian species, I shall assume that the N.S.W. animal is conspecific with *C. petterdi*, though the difference in colour, habitat, &c., would lead one to suppose that were a comparison instituted specific differences would be distinguished. To any Tasmanian naturalist who would assist me with specimens of *C. petterdi* for examination I should be most grateful.

The spirit specimen I have before me measures along the sole of the foot 15 mm., from the sole of the foot to the top of the visceral hump 7 mm., from the anterior to the posterior end of the mantle 12 mm., from the mouth to the pulmonary orifice 5 mm. The caudal mucous pore is small, not cleft to the sole, and from it a well-marked pedal line extends to the lips. The posterior half of the foot is free ; of this the anterior portion is broadened into a saddle-like space upon which rests the visceral mass as in *Helicarion*.

The cap-like mantle, to which the generic name alludes, covering the whole of the visceral hump gives this odd creature somewhat the aspect of an *Onchidella*; on either side the margin adheres to the body, but before and behind the free edge descends like a curtain, from beneath which the tail alone protrudes; along each side runs an irregular black zig-zag stripe, while the ground colour is like the tail a dull brown; under a high power it is seen to be finely papillated and transversely wrinkled; except the sinus at the pulmonary orifice no lobes or cicatrices as of lobes coalesced together are apparent. I found no trace of a shell. In both specimens dissected the stomach was quite empty. Jaw arcuated, rather narrow, excessively thin and fragile; upper margin entire, concave edge divided into a dozen irregular teeth which show a tendency to split into minor denticules; no rostrum or central limb. The jaw exhibits no raised ribs or stout denticules after the *Helix* pattern, but rather appears as if an originally smooth jaw were irregularly crumpled and frayed. The teeth of the radula are extremely small, and seem from the unusual length of the basal plate to be arranged in distant rows; the rows are nearly straight; some 45 ranks from the rachidian they sweep up into a shallow curve and then flatten out again. I have some doubts whether I interpreted the rachidian aright; it appeared to be broadly reflected, cordate in outline, tapering to an acuminate point, with traces of lateral cusps. The laterals are remarkable for their long narrow basal plates, twice the length of their reflections, which are straight, slender and tapering. In the plane of the membrane the teeth are straight, but vertically they curve almost into a hook. A proximal accessory cusp appears a few removes from the rachidian, further away a distal cusp is also added; as the accessory cusps are unsymmetrical, and being in different planes cannot be focussed at once, they are somewhat difficult to observe. The genital system appears much contorted at its orifice, after which it divides into three portions; the duct of the genital bladder, which is rather short, twisted and continuing after reaching the genital bladder is again expanded into a second sac; the penis sac stout and pyriform, invaginated upon itself and

produced into a slender flagellum; and the vagina long and slender and also invaginated upon itself.

The features of this mollusk I am quite unable to reconcile with the systematic position assigned to it by Tryon in the "Manual of Conchology, Series Pulmonata," Vol. I., p. 227. To me it is clearly an aberrant form of *Helicarion*, and the following classification would better describe its affinities:—Family, *Zonitidæ*; Subfamily, *Helicarioninæ*; Genus, *Cystopelta*.

Col. Godwin-Austen describes how he traced from species to species in the Indian *Helicarioninæ* a gradual diminution of the shell from the helicoid test of *Austenia* to the rudimentary shell of *Girasia*. The function of protecting the vital organs was gradually usurped by the mantle which became thicker and enlarged till the coalesced lobes exposed but a small portion of the shell. The advantage to the animal in ability to squeeze itself further and further into the crannies and crevices where it loves to hide is obvious, and the author speculates upon a further stage when the shell shall have entirely disappeared and the united mantle have entirely grown over it. This ideal form I believe we actually possess in *Cystopelta*, and in our Australian fauna we may say that as *Helicarion* is to *Parmacochlea*, so is the latter to *Cystopelta*.

No doubt *Aneitea* and *Limax* descended in a like manner from shell-bearing ancestors, who have only transmitted to them the little shapeless calcareous fragments concealed under the mantle to prove their genealogy. *Testacella* too, by similar reasoning, might claim some helicoid form like *Rhytida* for its origin in the dim past.

EXPLANATION OF PLATE.

Fig. 1.—Spirit specimen of *Cystopelta petterdi*, Tate (?) (×4½).
Fig. 2.—Rachidian, median and one lateral tooth of the odontophore of ditto (mag. 1000 diam.).
Fig. 3.—Jaw of ditto (much magnified).
Fig. 4.—Genital system of ditto (mag. 6 diam.).